

REMARKS

The above Amendments and these Remarks are being submitted in response to the Office Action dated July 3, 2001.

I. Summary of the Examiner's Rejections

Claims 1-6 appear to be rejected under 35 U.S.C. § 103(a) as being unpatentable over Aleksic (U.S. Patent No. 5,914,722) in view of Lentz, et al. (U.S. Patent No. 5,446,836).

II. Summary of the Applicant's Amendments

FIG. 1 has been amended to correct minor typographical errors presented therein, and also to make the illustration therein consistent with the originally filed specification. Claims 1-2 and 4 have been amended. Claims 7-17 have been added.

III. Applicant's Response to the Examiner's Rejections

A. Drawings

The Applicants request permission to amend the drawings to correct minor typographical errors in FIG. 1, as shown in red on the attached copy of the drawing, and also to make the illustration therein consistent with the originally filed specification. The Applicants submit that no new matter has been added by the amendments.

B. Rejection of Claims under 35 U.S.C. § 103

The Applicants wish to note that it is somewhat unclear within the body of the Office Action whether all of the claims have been rejected. More specifically, on page 2 of the Office Action the Examiner indicates that "...Claims 1 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Aleksic (U.S. Patent No. 5,914,722) in view of Lentz, et al. (U.S. Patent No. 5,446,836)..." After the aforementioned recitation, the Examiner then proceeds with a discussion relating to Claims 2-6 and providing reasons for their apparent rejection. Although it is not clear from the record, particularly the initial paragraph describing which claims have been rejected, that the entirety of Claims 1-6 have been rejected, the Applicants are responding herein as if all of the pending claims have been rejected.

Claim 1

Based on the discussion above, the Applicants respectfully traverse the rejection of Claims 1-6 for the reasons set forth below. The Applicant's invention as defined in amended Claim 1, calls for, among other things:

“...generating coordinate data representing an initial rasterization starting point estimate based in part on the region bits...”

Such limitation, and the benefits provided therefrom is not taught or suggested by the combination of references as cited by the Examiner. As understood, Aleksic is directed to a pixel scanning method used when a portion of an object being scanned crosses, or lies outside of a page boundary. The scanning of the object is described, for example, at column 3, line 62-column 4, line 10 (walk along each span, incrementing and x-coordinate of pixels along the span and decrementing the number of pixels making up the span). However, Aleksic is silent on how the initial scan point is generated.

In contradistinction, the Applicant's invention as defined in Claim 1 calls for “...generating coordinate data representing an initial rasterization starting point estimate based in part on the region bits...” The region bits are provided by another component which defines whether a triangle, or other suitable primitive, lies within a given boundary that is currently being rendered. The initial rasterization sampling point is then based, in part, on the region bits which define where a subsequent raster engine will begin sampling of the primitive. As Aleksic is silent on how to define where to initially begin scanning an object to be rendered, it cannot and does not render the invention as defined in Claim 1 obvious.

Adding the teachings of Lentz, et al. to the teachings of Aleksic will also not render the invention as defined in Claim 1 obvious as Lentz, et al. does not overcome the deficiencies described above with respect to Aleksic. In addition, Lentz does not teach or suggest “...generating coordinate data representing an initial rasterization starting point estimate based in part on the region bits...” as defined in Claim 1.

As understood, Lentz, et al. is directed to a system and method for rendering polygons that incorporate a w-bit wide render mask to provide an indication of which bits along a scan line are to be subsequently rendered. See, for example, column 6, lines 34-55. However, there is no teaching or suggestion of the generation or use of “...initial rasterization starting point...” data as defined in Claim 1. In fact, Lentz, et al. states that “Methods for determining the order of

traversal are not discussed here.” (See, column 9, lines 52-53). Thus, the initial point at which to start rasterization is seemingly not a consideration in Lentz, et al.

An advantage provided by employing the claimed invention is that the initial rasterization starting point can be used to efficiently and quickly render a primitive by providing a rasterizer (or raster engine) within an initial position that is substantially near or within the primitive to be rendered. This is in contrast to the mask methodology disclosed in Lentz, et al. which includes data to be scanned that is not near the primitive. Consequently, Lentz, et al. does not render the invention as defined in Claim 1 obvious.

Thus, as neither Aleksic nor Lentz, et al. individually teach or suggest the invention as disclosed in Claim 1, their combination also does not render the invention as defined in Claim 1 obvious for the reasons set forth above. Accordingly, reconsideration of the rejection of Claim 1 is respectfully requested.

Claims 2-3 directly or indirectly depend upon and include the limitations of Claim 1 and are allowable at least for the reasons associated with Claim 1. In addition, these claims define additional subject matter which is also not taught or suggested by the combination of references as cited by the Examiner. For example, Claim 3 is directed to sorting vertex data corresponding to a primitive to be rendered in a predetermined direction. Such methodology is not rendered obvious by the combination of references and, in fact, Lentz, et al. explicitly states that “...methods for determining the order of traversal are not discussed here...” (see column 9, lines 52-53). Accordingly, reconsideration of rejection Claims 1-3 is respectfully requested.

Claim 4

Claim 4 is an apparatus claim describing a circuit which employs the methodology as defined in Claim 1. Claim 4, include a limitation directed to:

“...an initial rasterization starting point estimation circuit operative to generate an initial rasterization starting point estimate coordinates for scanning of the triangle in response to the region bits...”

As such, Claim 4 defines a mechanism for generating the initial rasterization starting point for a primitive to be rendered. As discussed in greater detail above, the combination of Aleksic and Lentz, et al. does not teach or suggest the use of an initial rasterization starting point or a mechanism for making such a determination. As such, the combination of Aleksic and Lentz, et

al. cannot and does not render the invention as defined in Claim 4 obvious. Accordingly, reconsideration of the rejection of Claim 4 is respectfully requested.

Claims 5 and 6 depend upon and include all the limitations of Claim 4 and are allowable at least for the reasons set forth above with respect to Claim 4. Accordingly, reconsideration of the rejection of Claims 4-6 is respectfully requested.

IV. New Claims

Claims 7-17 have been added to further define and illustrate the novel structural and operational features of the present invention. The Applicants respectfully submit that the invention defined by these new claims is also allowable over the art of record.

Based on the above amendments and remarks, it is respectfully submitted that Claims 1-17 are now in proper condition for allowance and such action is earnestly solicited.

V. Change of Correspondence Address


Please address all future communications relating to the above-identified application to the following:

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A separate, formal Change of Correspondence Address request is attached hereto as Exhibit C.

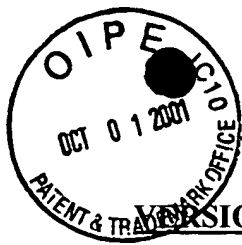
The Commissioner is hereby authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-0441 for any payment in connection with this communication, including any fees for extension of time, which may be required. The Examiner is invited to call the undersigned if such action might expedite the prosecution of this application.

Respectfully submitted,

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September 27, 2001

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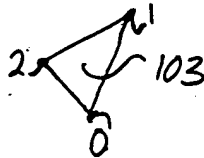


VERSION SHOWING CHANGES MADE

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IN THE CLAIMS:

1. (Amended) A method comprising:
receiving[; in a circuit, first, second and third] vertex data corresponding to first, second and third vertices of a triangle;
generating[, in a circuit,] region bits representing a location each of the first, second and third vertices with respect to a tile being rendered; [and]
[outputting coordinate data to a rasterizer, the] generating coordinate data representing an initial rasterization starting point estimate based in part on the region bits[.]; and
providing the initial rasterization starting point estimate to a rasterizer.
2. (Amended) The method of Claim 1, further comprising:
generating[, in the circuit,] an orientation bit representing an orientation of a line connecting the first and second vertices with respect to a line connecting the first and third vertices.
4. (Amended) A circuit comprising:
a region calculation circuit configured to receive sorted vertex data corresponding to vertices of a triangle, the region calculation circuit configured to generate region bits representing a position of the sorted vertices with respect to a tile being rendered; and
an initial rasterization starting point estimation circuit [configured to receive the region bits and] operative to generate an initial rasterization starting point estimate coordinates for scanning of the triangle in response to the region bits, the initial rasterization starting point estimation circuit including a circuit for discarding a triangle when the corresponding vertex data lies outside a boundary defined by the region bits.



Vertex Vertice Data Feeding Circuit 100

